

1-21. (CANCELED)

22. (NEW) A roller device (100-180) for displacing a load (1) in a generally horizontal plane between a load handling apparatus with forks and a machine (20), the device being designed to equip the forks (10) of a handling device, the roller device comprising;

at least one rail (310) defining at least one plane contact surface (S) capable of supporting the load (1) when the load is static, the rail (310) being hollow, generally horizontal, and provided with a longitudinal opening (320);

at least one counter-rail (210) housed inside the rail (310) and inside of which roller elements (230) are attached opposite the longitudinal opening (320), the roller elements (230) being located in a plane that is generally parallel to the surface (S) and capable of supporting the load (1) when the load is moving; and

an actuating means (400, 400', 600-1000) being connected to at least one of the rail (310) and the counter-rail (210) so as to be movable relative to another of the rail (310) and the counter-rail (210) between at least one lower position and one upper position, in the upper and the lower positions, the load is supported either by the rail (310) or by the counter-rail (210), the actuating means being disposed to displace the at least one rail (210) and the at least one counter rail (310) in at least a horizontal translation (Th), with lifting means (500, 500') being disposed between the at least one rail (210) and the at least one counter rail (310) to cause the at least one rail (210) and the at least one counter rail (310) to move in a vertical displacement (Tv) simultaneously with the horizontal displacement (Th), the actuating means (400, 400', 610-1100) comprises,

at least one block (450, 20', 650-1150) designed to be attached to the machine (20), and

at least one actuator (410, 410', 610-1110) disposed between the at least one rail (210) and the at least one counter rail (310) and designed to cooperate with the block and to transform a vertical force exerted by the block on the actuator into a horizontal force exerted by the actuator on the at least one rail (210) and the at least one counter rail (310) to

displace the load in the horizontal translation (Th) when the forks (10) on the load handling apparatus are connected to the machine (20).

23. (NEW) The roller device (100-130, 150-180) according to claim 22, wherein the lifting means (500) comprises inclined ramps (331) integral with the rail (310) and designed to cooperate with the roller elements (230) on the counter-rail (210).

24. (NEW) The roller device according to claim 23, wherein the inclined ramps (331) define at least a first zone (331a) designed to allow at least tops of the roller elements (230) to project, a second zone (331b) designed to cover the roller elements (230), and an intermediate zone (331c) forming, in combination with the roller elements, the lifting ramps.

25. (NEW) The roller device according to claim 24, wherein each of the roller elements comprise at least one roller (230) designed to support the load (1) in a moving position, the roller (230) being attached to a generally horizontal axle (220) between two other rollers (240) of smaller diameter, the two other rollers (240) being in contact with the inclined ramps (331).

26. (NEW) The roller device (140) according to claim 22, wherein the lifting means (500') comprises articulated bearings (510) having a first extremity connected to the rail (310) and a second extremity connected to the counter-rail (210).

27. (NEW) The roller device according to claim 22, wherein the actuator is chosen from a group comprising at least a pivoting lever (410, 410'), a ball and socket (710), a rotating element (610), and a cylinder (810, 910).

28. (NEW) The roller device according to claim 22, wherein the rail (310) is fixed and the counter-rail (210) supporting the roller elements (230) is movable and cooperates with the actuator (410, 410', 610-1110), the actuator being designed to displace the counter-rail (210) from the lower position to the upper position when in contact with the block (450, 20', 650-1150) and to allow the counter-rail (210) to descend into the lower position by gravity when the counter-rail (210) is no longer in contact with the block.

29. (NEW) The roller device (100) according to claim 28, wherein the actuator comprises at least one pivoting lever (410) attached to the rail (310) by an axle (420) oriented

in a generally perpendicular direction to a direction of the horizontal displacement (Th) of the counter-rail (210), the pivoting lever (410) comprising at least two contact zones (430, 440) located on either side of the axle (420), a first contact zone (440) is in contact with the counter-rail (210) and a second contact zone (430) is designed to cooperate with the block (450).

30. (NEW) The roller device according to claim 29, wherein the pivoting lever (410) comprises at least a first roller element (230) located between the two contact zones (430, 440) and designed to complement the roller elements (230) on the counter-rail (210) when the counter-rail (210) is in the upper position.

31. (NEW) The roller device (110) according to claim 28, wherein the actuator comprises at least one pivoting lever (410') attached to the counter-rail (210) by an axle (420') oriented in a generally perpendicular direction to a direction of horizontal displacement (Th) by the counter-rail (210), the pivoting lever (410) comprising at least two contact zones (430', 440'), a first contact zone (440') is in contact with the rail (310) and a second contact zone (430') is designed to cooperate with the block

32. (NEW) The roller device according to claim 31, wherein the first contact zone (440') consists of a travel ramp capable of cooperating with a rotating element (441') integral with the rail (310).

33. (NEW) The roller device (120) according to claim 28, wherein the actuator comprises at least one rotating element (610) attached to the counter-rail (210) by an axle oriented in a generally perpendicular direction to a direction of horizontal displacement (Th) of the counter-rail, the rotating element (610) being designed to move along an inclined ramp (620) integrated within the block (650), the rail (310) being guided in vertical translation within the block (650) by a tenon (630) and a slide (640) system.

34. (NEW) The roller device (130, 140) according to claim 28, wherein the actuator comprises at least one ball and socket (710) having at least one contact zone (720) disposed at an intersection of two articulated lever arms (730) respectively connected to the rail (310) and to the counter-rail (210) along axles that are generally perpendicular to the horizontal

displacement (Th) of the counter-rail (210), the contact zone (720) being designed to cooperate with the block (750).

35. (NEW) The roller device according to claim 29, wherein the contact zones (430, 440, 430', 720) are comprised of rotating elements.

36. (NEW) The roller device (150, 160) according to claim 28, wherein the actuator comprises at least one double cylinder (810, 910), a first piston (840, 940) of which cooperates with the counter-rail (210) and is generally parallel to the horizontal displacement (Th), and a second piston (820, 920) of which is designed to cooperate with the block (850, 950) and is generally perpendicular relative to the first piston (840, 940).

37. (NEW) The roller device according to claim 36, wherein the second piston (820, 920) is associated with a recall means (830, 930).

38. (NEW) The roller device (160) according to claim 36, wherein chambers (911, 913) of the first and the second pistons (920, 940) are separate and interconnected by at least one conduit (912) housed in the rail (310).

39. (NEW) The roller device (170, 180) according to claim 28, wherein the actuator comprises at least one rotating element (1010, 1110) attached to the rail (310) by an axle (1011, 1111) oriented generally perpendicular to the horizontal displacement (Th) of the counter-rail (210) and guided in translation within the rail (310) by grooves (1021, 1121), the rotating element (1010, 1110) being designed to cooperate with two ramps (1020, 211; 311, 1120) provided on the rail (310) and the counter-rail (210), respectively, at least one of the ramps (1020, 1120) being inclined.

40. (NEW) The roller device according to claim 39, wherein the rotating element (1010, 1110) comprises at least three coaxial rollers (1012, 1013, 1014; 1112, 1113, 1114) of different diameters, at least two of the three coaxial rollers are movable in relation to each other, the two of the three coaxial rollers being designed to respectively cooperate with the ramp (1021, 311) integral with the rail (310), the ramp (211, 1120) integral with the counter-rail (210), and the block (1050, 1150).

41. (NEW) The roller device according to claim 22, wherein the block is selected from among at least a tie rod (450, 650-1150) capable of receiving a front extremity of the forks (10) and a machine table (10'), and is at least partially shaped to be compatible with the actuator (410, 410', 610-1110).

42. (NEW) A load handling device with forks for displacing a load (1) in a generally horizontal plane between the load handling device and a machine (20), the forks (10) comprise the roller device (100-180), the device being designed to equip the forks (10) of a handling device, the roller device comprising;

at least one rail (310) defining at least one plane contact surface (S) capable of supporting the load (1) when the load is static, the rail (310) being hollow, generally horizontal, and provided with a longitudinal opening (320);

at least one counter-rail (210) housed inside the rail (310) and inside of which roller elements (230) are attached opposite the longitudinal opening (320), the roller elements (230) being located in a plane that is generally parallel to the surface (S) and capable of supporting the load (1) when the load is moving; and

an actuating means (400, 400', 600-1000) being connected to at least one of the rail (310) and the counter-rail (210) so as to be movable relative to another of the rail (310) and the counter-rail (210) between at least one lower position and one upper position, in the upper and the lower positions, the load is supported either by the rail (310) or by the counter-rail (210), the actuating means being disposed to displace the at least one rail (210) and the at least one counter rail (310) in at least a horizontal translation (Th), with lifting means (500, 500') being disposed between the at least one rail (210) and the at least one counter rail (310) to cause the at least one rail (210) and the at least one counter rail (310) to move in a vertical displacement (Tv) simultaneously with the horizontal displacement (Th), the actuating means (400, 400', 610-1100) comprises,

at least one block (450, 20', 650-1150) designed to be attached to the machine (20), and

at least one actuator (410, 410', 610-1110) disposed between the at least one rail (210) and the at least one counter rail (310) and designed to cooperate with the block and to transform a vertical force exerted by the block on the actuator into a horizontal force exerted by the actuator on the at least one rail (210) and the at least one counter rail (310) to displace the load in the horizontal translation (Th) when the forks (10) on the load handling apparatus are connected to the machine (20).